

Serial No.: 09/619,768
OA dated May 16, 2003
Prel Sub. dated September 16, 2003

REMARKS

By the present amendment, claims 13-15, 17-20, 24 and 29 have been amended to obviate the examiner's objections thereto and/or to further clarify the concepts of the present invention. In addition, independent claims 39 and 40 have been added. By a separate sheet attached hereto, the fee necessitated by the presentation of additional claims has been calculated and a check in that amount is enclosed. Entry of these amendments is respectfully requested.

Initially, applicants acknowledge with appreciation the indication contained in the Office Action of May 16, 2003, that claims 17-19, 24-28 and 36 are allowable over the art and claims 32 and 33 were allowed.

In the previously mentioned Office Action, claims 13-14, 17-19, 24 and 29 were rejected under the second paragraph of 35 USC § 112 as being indefinite. In particular, the following was alleged:

(1) Claims 13, 17-19 - It was asserted that the claims were confusing in terms of the relationship between the dissolution unit and the preparation tank. In so doing, the following observations were made:

(a) From Figure 2, the entire apparatus is the dissolution unit 22 that comprises the preparation tank 21. In response, it is submitted that, as is evident from Fig. 2, reference numeral 11 with lead line with an arrow point from its placement generally indicates the entire apparatus, that is, the solution refinement device.

(b) The claims recite that the apparatus comprises the dissolution unit and the preparation tank. In response, it is submitted that there is no instance in any of the pending claims that supports the position of the examiner including claim 14 as discussed below in detail.

(c) The disclosure at lines 21-34 of page 7 of the specification in reciting the elements of the dissolution unit, does not state that the unit includes the preparation tank. In response, it is submitted that this disclosure specifically recites "the dissolution unit includes...." and then sets forth a number of elements. By definition, the term "includes" is open-ended or non-limiting and thus this disclosure is not contrary to the dissolution unit containing other elements including the preparation tank.

(d) Original claim 14 defined the preparation tank as an element of the apparatus, not of the dissolution unit. In response, the subject matter of this original claim did not preclude the preparation tank being a part of the dissolution unit. The claim merely recited that the apparatus included both a dissolution unit and a preparation tank with no

mention of the relationship between the two. Clearly, the preparation tank could be an element of the dissolution unit with such claim language.

(2) Claim 14 - There is no disclosure that the dissolution unit includes a gas supply unit as recited in this claim. In response, the gas supply unit is no longer recited in this claim.

(3) Claim 14 - It was asserted that the claim implies that the preparation tank is a separate element from the dissolution unit which is contrary to the position of applicants that the dissolution unit includes the preparation tank. Regarding the relationship between the preparation tank and the dissolution unit, the preparation tank is a separate component from the dissolution unit and the amended claims have clarified this relationship.

(4) Claims 17-19 and 24 - It was alleged that the recitation of the dissolution unit and one of the gas discharge control unit and the liquid discharge control unit operate simultaneously is confusing since, if either of the recited units are included in the dissolution unit, the statement has no meaning. Further, it was alleged that since the dissolution unit comprises a number of elements, operation of one of these elements would be operation of the dissolution unit.

Regarding the recitation "wherein one of the gas discharge control unit and the liquid discharge control unit is operated at substantially the same time as the dissolution unit" of

claims 17-19 and 24, the discharge unit is a separate element from the dissolution unit. Since the dissolution unit does not include the discharge unit, the foregoing recitation is clear.

Furthermore, it is submitted that the subject claims as amended distinguish over the art cited in the above-mentioned Office Action. More particularly, the following rejections were made:

(1) Claims 13-15 and 23 were rejected under 35 USC § 102(b) as being anticipated by the patent to Nakajima et al.

(2) Claims 13-15 and 20 were rejected under 35 USC § 102(b) as being anticipated by the patent to Nelson et al.

(3) Claims 13-16, 20, 23, 29, 34-35, 37 and 38 were rejected under 35 USC § 102(b) as being anticipated by the patent to Nurmi et al.

(4) Claims 13-16, 23, 29, 34 and 38 were rejected under 35 USC § 102(b) as being anticipated by the patent to Ginsburgh et al.

As before, in making each of these rejections, it was asserted that the particularly cited patent teaches each element of the apparatus as claimed.

In addition, claims 29, 34, 37 and 38 were rejected under 35 USC § 103(a) as being unpatentable over the above patent to Nelson et al. In addition, claims 21-22 were rejected under 35 USC § 103(a) as being unpatentable over the above patent to Nurmi et al and on page eighteen, claims 20-22, 30-31 and 36 were rejected under 35 USC § 103(a) as being unpatentable over the above patent to Nakajima et al further in view of the '080 Japanese patent publication. Reconsideration of these rejections in view of the above claim amendments and the following comments is requested.

It is submitted that the claims as amended patentably distinguish over the cited patents whether taken singly or in combination. It is to be recognized that one of the technical features of the present invention is simultaneously performing a gas dissolving operation and a gas/liquid discharging operation to increase the purity of a chemical solution by removing impurities from a preparation tank.

To prepare a purified chemical solution, the present invention provides a chemical solution preparation apparatus which includes at least either one of a gas discharge control unit and a liquid discharge control unit. The gas discharge control discharges an adjusted amount of gas that is not dissolved in a liquid stored in a preparation tank. The liquid discharge control discharges a predetermined amount of the chemical solution that is under preparing. Even if impurities are contained in the gas and/or the liquid, the impurities are removed from the preparation tank by discharging a part of undissolved gas and/or a

part of the chemical solution that is under preparing. As the result, a chemical solution with a high purity can be prepared by the claimed apparatus.

It is submitted that none of the cited patents teach or suggest, among other things, the technical feature of the present invention, that is, removing impurities from the preparation tank by discharging an adjusted amount of the undissolved gas and/or a predetermined amount of the chemical solution while preparing the chemical solution by dissolving a stock gas to a stock liquid. Specifically, it is submitted that:

The Nakajima et al patent discloses at col. 4, lines 1 to 12 a substrate cleaning apparatus including a processing tank 1 in which substrates are cleaned by a liquid chemical agent and a liquid chemical agent producing device which produces and recycles the liquid chemical agent. To maintain the concentration of the chemical solution, HCl gas is supplied to a mixing unit 17 and is dissolved in the used chemical solution.

The Nakajima et al patent does not contain any teaching regarding impurities which may be contained in the used liquid chemical agent and the HCl gas. Although excess amounts of HCl gas are discharged from the mixing unit 17 via a gas outlet 17d, this gas discharge is not for increasing the purity of the liquid chemical agent. Therefore, the technical concept of the Nakajima et al patent is quite different from that of the claimed invention, and thus the presently claimed invention is not taught or suggested by the

Nakajima et al patent.

The cited Nelson et al patent discloses a system for producing ozonated water, the system including a pressurized vessel 2 in which ozonated water is prepared. As described on col. 6, lines 66 to col. 7, line 16 of the Nelson et al patent, the system is based on Henry's Law, that is, the pressurized vessel 2 is maintained at relatively high pressure to increase the quantity of ozone dissolved in a liquid. Although excess amount of ozone is discharged from the pressurized vessel 2 for safety considerations, the technical concept of the Nelson et al patent is significantly different from that of the presently claimed invention. Among other things, if an adjusted amount of gas (ozone) is discharged from the pressurized vessel 2 while preparing the ozonated water, the pressure of the vessel 2 decreases and the quantity of ozone in the ozonated water decreases.

In addition, the Nelson et al patent discloses a continuous supply of gas and a continuous discharge of ozonated water. The continuous supply of gas is for maintaining the pressure of the pressurized vessel 2. The continuous discharge of the ozonated water is to have the system 1 operate continuously. Again, the technical concept of the Nelson et al patent is quite different from that of the claimed invention.

Furthermore, the system of the Nelson et al patent uses fresh ozone gas and ultrapure deionized water to produce ozonated water since ozone is easily decomposed

by an impurity. Since impurity free gas and water are used in the system of the Nelson et al patent, there is no need to remove impurities from the pressurized vessel 2 to increase the purity of the ozonated water.

The Nurmi et al patent discloses a system for generating a vapor saturated with a volatile liquid chemical, such as silane, in a saturation vessel 106. Since the disclosure of the Nurmi et al patent is not concern about impurities which may be contained in the volatile liquid chemical, the patent does not disclose removing impurities from the saturation vessel 106 by discharging an adjusted amount of the undissolved gas and/or a predetermined amount of the volatile liquid chemical while generating a vapor in the saturation vessel 106.

The Ginsburgh patent discloses a mixing apparatus 10 for producing a controllable safety-enhanced fuel by mixing an inert gas such as CO₂ with a hydrocarbon fuel in a mixing receptacle 20. Since the Ginsburgh patent is not concerned with impurities which may be contained in the hydrocarbon fuel and the inert gas, the Ginsburgh patent does not disclose removing impurities from the mixing receptacle 20 by discharging an adjusted amount of the undissolved inert gas and/or a predetermined amount of the fuel while producing the safety-enhanced fuel in the mixing receptacle.

In view of the foregoing detailed discussion and the amendments herein, it is

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submitted that the subject application is now in condition for allowance and early notice to that effect is earnestly solicited.

In the event this paper is not timely filed, the undersigned hereby petitions for an appropriate extension of time. The fee for this extension may be charged to Deposit Account No. 01-2340, along with any other additional fees which may be required with respect to this paper.

Respectfully submitted,

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